USDA Natural Resources
Conservation Service

Ecological site R039XA129AZ
Clay Bottom 17-22"

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General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

MLRA notes

Major Land Resource Area (MLRA): 039X–Mogollon Transition North

AZ 39.1 Mogollon Plateau Coniferous Forests

Elevations range from 7000 to 12,500 feet and precipitation averages 20 to 35 inches per year. Vegetation includes ponderosa pine, Gambel oak, Arizona walnut, sycamore, Douglas fir, blue spruce, Arizona fescue, sheep fescue, mountain muhly, muttongrass, junegrass, pine dropseed, and dryland sedges. The soil temperature regime ranges from mesic to frigid and the soil moisture regime ranges from typic ustic to udic ustic. This unit occurs within the Colorado Plateau Physiographic Province and is characterized by a sequence of flat to gently dipping sedimentary rocks eroded into plateaus, valleys and deep canyons. Sedimentary rock classes dominate the plateau with volcanic fields occurring for the most part near its margin.

Associated sites

R039XA130AZ	**Loamy Bottom 17-22" p.z.**
R039XA138AZ	**Clay Loam Upland 17-22 p.z.**

Table 1. Dominant plant species

Tree	(1) *Pinus ponderosa*
Shrub	(1) *Artemisia ludoviciana* (2) *Ericameria nauseosa ssp. nauseosa var. glabrata*
Herbaceous	(1) *Muhlenbergia wrightii* (2) *Festuca arizonica*

Physiographic features

This site is found in the bottom areas of alluvial flats. The does benefit from run-on moisture from adjacent areas.

Table 2. Representative physiographic features

Landforms	(1) Alluvial flat (2) Drainageway
Flooding duration	Extremely brief (0.1 to 4 hours) to brief (2 to 7 days)
Flooding frequency	Occasional
Ponding duration	Very brief (4 to 48 hours) to brief (2 to 7 days)
Ponding frequency	Occasional
Elevation	6,000–8,000 ft
Slope	0–3%
Ponding depth	0–1 in
Aspect	Aspect is not a significant factor

Climatic features

About 40% of the moisture in this Common Resource Area (CRA), or Land Resource Unit (LRU) comes as rain from June to September. The remainder comes from October to May as snow or light rain. Extreme temperatures of 97 and -37 degrees Fahrenheit have been recorded. Some moisture is usually received every month.

Table 3. Representative climatic features

Frost-free period (average)	168 days
Freeze-free period (average)	120 days
Precipitation total (average)	22 in

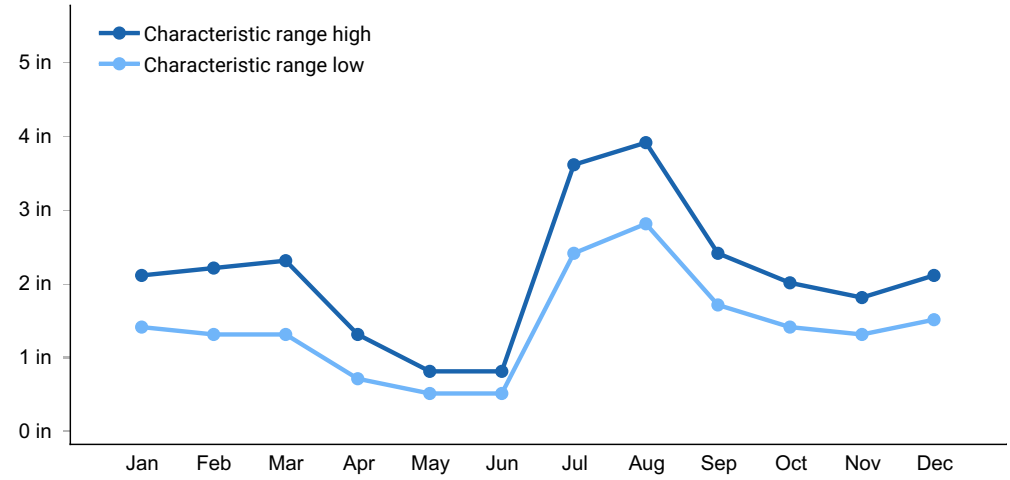


Figure 1. Monthly precipitation range

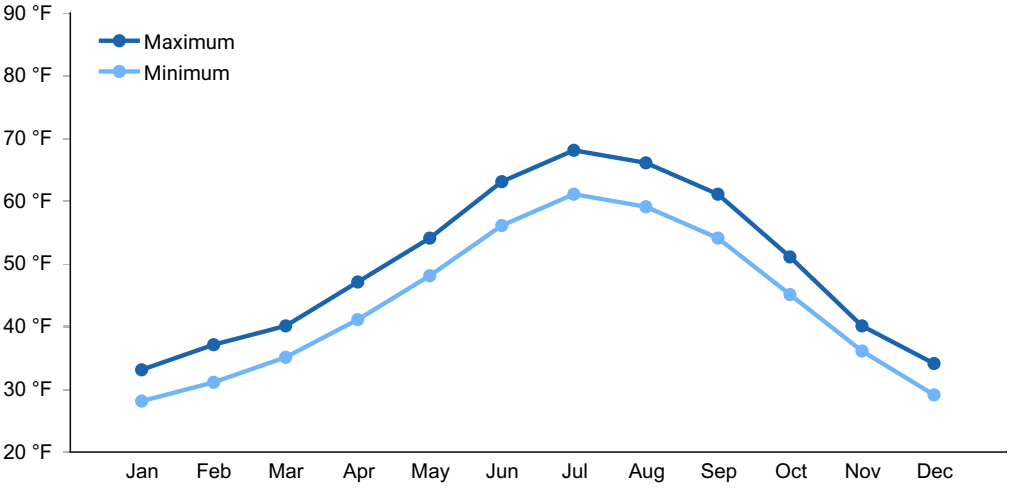


Figure 2. Monthly average minimum and maximum temperature

Influencing water features

This site experiences occasional ponding of a duration ranging from very brief to brief. It experiences occasional flooding of duration ranging from very brief to brief.

Soil features

Soils in this site are deep. Surface layer is about 3 inches thick. Hazard of erosion is slight. The soil can absorb and hold all the moisture the climate provides.

Typical taxonomic unit includes:

SSA 695 Kaibab NF area - MU 9-Millboro family clay.

MU 23, Sunset Crater National Monument- Cumulic Haplustolls extremely gravelly sandy loam, 0 to 2 percent slopes

Table 4. Representative soil features

Surface texture	(1) Clay
Family particle size	(1) Clayey
Drainage class	Somewhat poorly drained to well drained
Permeability class	Moderately slow to slow
Soil depth	40–60 in
Available water capacity (0-40in)	0.13–0.21 in
Calcium carbonate equivalent (0-40in)	0–1%
Electrical conductivity (0-40in)	0–2 mmhos/cm
Sodium adsorption ratio (0-40in)	0–2
Soil reaction (1:1 water) (0-40in)	7.4–8.4

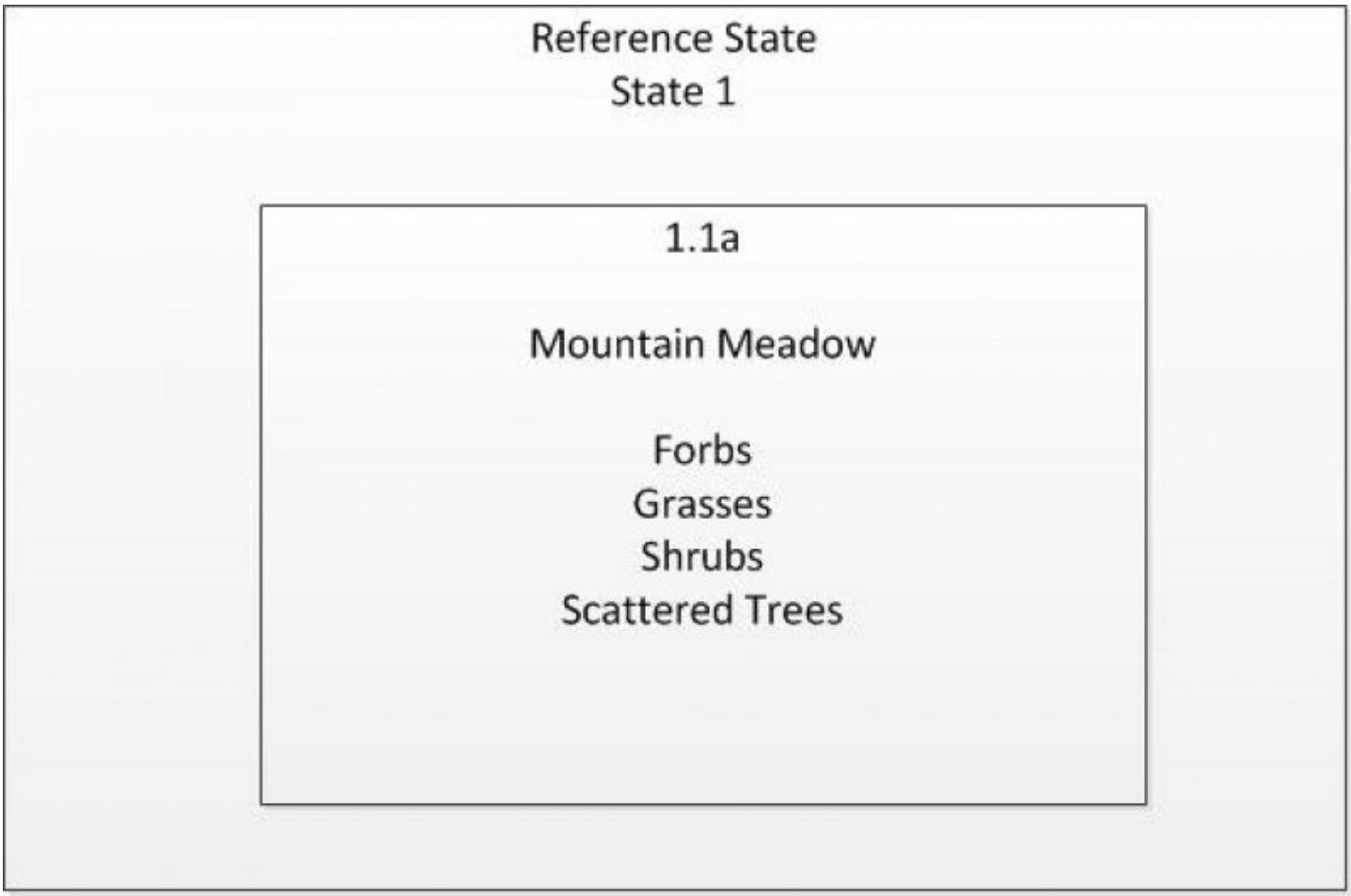
Ecological dynamics

The plant communities found on an ecological site are naturally variable. Composition and production will vary with yearly conditions, location, aspect, and the natural variability of the soils. The historical climax plant community represents the natural potential plant communities found on relict or relatively undisturbed sites. Other plant communities described here represent plant communities that are known to occur when the site is disturbed by factors such as grazing, fire, or drought.

Production data provided in this site description is standardized to air-dry weight at the end of the summer growing season. The plant communities described in this site description are based on near normal rainfall years.

NRCS uses a Similarity Index to compare existing plant communities to the plant communities described here. Similarity Index is determined by comparing the production and composition of a plant community to the production and composition of a plant community described in this site description. To determine Similarity Index, compare the production (air-dry weight) of each species to that shown in the plant community description. For each species, count no more than the maximum amount shown for the species, and for each group, count no more than the maximum shown for the group. Divide the resulting total by the total normal year production shown in the plant community description. If rainfall has been significantly above or below normal, use the total production shown for above or below normal years. If field data is not collected at the end of the summer growing season, then the field data must be corrected to the end of the year production before comparing it to the site description. The growth curve can be used as a guide for estimating production at the end of the summer growing season.

State and transition model



State 1
Historic Climax Plant Community

Community 1.1
Historic Climax Plant Community

This site is an open grassland. The plant community is made up of a roughly equal number of warm and cool season grasses. It also includes a variety of annual and perennial forbs with a few scattered half-shrubs and shrubs.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	490	540	585
Forb	65	82	98
Shrub/Vine	30	48	65
Tree	0	3	6
Total	**585**	**673**	**754**

Table 6. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	0%
Grass/grasslike foliar cover	15-20%
Forb foliar cover	1-5%
Non-vascular plants	0%
Biological crusts	0%
Litter	0%
Surface fragments >0.25" and <=3"	10-15%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	30-35%

Table 7. Canopy structure (% cover)

Height Above Ground (Ft)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.5	–	–	–	–
>0.5 <= 1	–	–	–	1-5%
>1 <= 2	–	0-5%	15-20%	–
>2 <= 4.5	–	–	–	–
>4.5 <= 13	–	–	–	–
>13 <= 40	–	–	–	–
>40 <= 80	–	–	–	–
>80 <= 120	–	–	–	–
>120	–	–	–	–

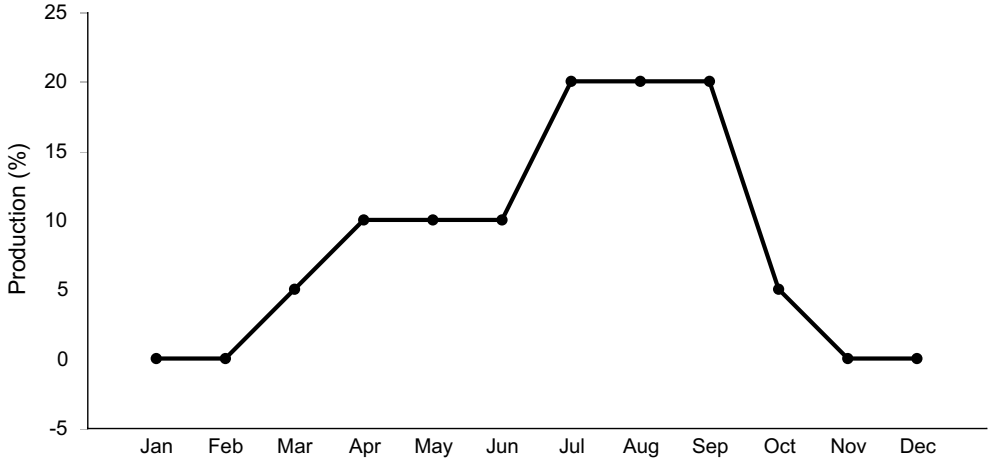


Figure 4. Plant community growth curve (percent production by month). AZ3911, 39.1 17-22" p.z. all sites. Growth begins in the spring, most growth occurs during the summer rainy season..

Additional community tables

Table 8. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Tree					
0				0–10	
	ponderosa pine	PIPO	*Pinus ponderosa*	0–10	–
Shrub/Vine					
0				65–130	
	white sagebrush	ARLU	*Artemisia ludoviciana*	35–70	–
	cinquefoil	POTEN	*Potentilla*	35–70	–
3				60–105	
	rubber rabbitbrush	ERNAG	*Ericameria nauseosa ssp. nauseosa var. glabrata*	35–65	–
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	20–35	–
	pingue rubberweed	HYRI	*Hymenoxys richardsonii*	10–15	–
Grass/Grasslike					
0				240–375	
	spike muhly	MUWR	*Muhlenbergia wrightii*	100–160	–
	deergrass	MURI2	*Muhlenbergia rigens*	65–100	–
	Arizona fescue	FEAR2	*Festuca arizonica*	65–100	–

	mountain muhly	MUMO	*Muhlenbergia montana*	5–20	–
	pine dropseed	BLTR	*Blepharoneuron tricholepis*	5–15	–
	Ross' sedge	CARO5	*Carex rossii*	5–15	–
	nodding brome	BRAN	*Bromus anomalus*	0–5	–
1				50–135	
	Canada bluegrass	POCO	*Poa compressa*	30–65	–
	squirreltail	ELELE	*Elymus elymoides ssp. elymoides*	20–35	–
	Fendler's threeawn	ARPUF	*Aristida purpurea var. fendleriana*	0–15	–
	western wheatgrass	PASM	*Pascopyrum smithii*	0–15	–
	slender wheatgrass	ELTRT	*Elymus trachycaulus ssp. trachycaulus*	0–5	–
	prairie Junegrass	KOMA	*Koeleria macrantha*	0–5	–
2				5–40	
	blue grama	BOGR2	*Bouteloua gracilis*	5–30	–
	muhly	MUHLE	*Muhlenbergia*	5–10	–
Forb					
0				65–100	
	western yarrow	ACMIO	*Achillea millefolium var. occidentalis*	10–25	–
	iris	IRIS	*Iris*	5–20	–
	lupine	LUPIN	*Lupinus*	5–10	–
	beardtongue	PENST	*Penstemon*	5–10	–
	weakleaf bur ragweed	AMCO3	*Ambrosia confertiflora*	5–10	–
	sandwort	ARENA	*Arenaria*	5–10	–
	aster	ASTER	*Aster*	0–10	–
	mustard	BRASS2	*Brassica*	0–10	–
	redroot buckwheat	ERRA3	*Eriogonum racemosum*	5–10	–
	spurge	EUPHO	*Euphorbia*	0–10	–
	thistle	CIRSI	*Cirsium*	0–5	–
	milkvetch	ASTRA	*Astragalus*	0–5	

	milkvetch	ASTRA	*Astragalus*	0–5	–
	flax	LINUM	*Linum*	0–5	–

Animal community

This site is well suited for all classes of livestock except when covered by snow. It is used primarily for late spring, summer and early fall grazing. Prescribed Grazing systems are essential to maintain the plant community balance on the site and to reduce the chance of soil erosion or compaction. Grazing this site while excessively wet will result in compacted soils, composition changes and lowered production. Grazing animals can be used as a tool to maximize plant diversity.
This site offers a fair diversity in the vegetative complex for wildlife. In higher condition classes the site is most suitable to grassland wildlife species. As retrogression occurs the woody species increase and wildlife species utilizing the site may change.

Recreational uses

This is a relatively level site on the bottom areas of alluvial flats. This site has a variety of summer flowers. It has excellent aesthetic appeal because of the open grassland appearance.
Summers are cool and pleasant but winters are harsh and cold.
Hunting, camping, hiking, cross-country skiing, photography and wildlife observation are favorite activities.

Type locality

Location 1: Coconino County, AZ	
Township/Range/Section	T21N R5E S10
General legal description	Bellemont, AZ Topog, SW1/4, SW1/4, Sec 10, T21N, R5E.

Contributors

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Stephen Cassady

Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

Author(s)/participant(s)	
Contact for lead author	
Date	
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:**

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2. **Presence of water flow patterns:**

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3. **Number and height of erosional pedestals or terracettes:**

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**

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5. **Number of gullies and erosion associated with gullies:**

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6. **Extent of wind scoured, blowouts and/or depositional areas:**

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7. **Amount of litter movement (describe size and distance expected to travel):**

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8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

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11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**

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12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

    Dominant:

    Sub-dominant:

    Other:

    Additional:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**

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14. **Average percent litter cover (%) and depth (in):**

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

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16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment**

and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:

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17. **Perennial plant reproductive capability:**
